

Title of the Thematic Issue

Regenerative Medicine Advances and Pitfalls

Section Editor/ Guest Editor: Wenchun Qu

• **Scope of the Thematic Issue:**

As our population is aging, medical providers and scientists endeavor to search for cures for many degenerative conditions such as osteoarthritis or degenerative disc disease. Standard treatments for these diseases include lifestyle modifications, drugs or surgical procedures with a primary goal of alleviating symptoms, but face challenges of side effects and lack of long-term benefit. In recent years, the field of regenerative medicine has shown promise in developing novel approaches for treatments of degenerative diseases. Through the use of biologics such as adult stem cells, platelet-rich plasma, exosomes, gene therapies, and other modalities, it was hoped to reduce disease progression and to induce and stimulate tissue repair. In addition, biologics are being studied for their potential benefit in a larger variety of conditions, including patients suffering from ischemic injuries, inflammatory diseases, chronic wounds, and many other diseases. Previous studies have demonstrated the safety of researched biologics including platelet-rich plasma or mesenchymal stem cells when applied to the joints [1], intervertebral discs [2] or intrathecal space [3, 4] in human trials. They have shown promise when used in musculoskeletal conditions such as osteoarthritis [5, 6], tendinopathies [7] and wounds [8, 9], in regeneration of the heart [10], and in management of neurologic conditions [4], COPD [11], pulmonary fibrosis [12], renal artery stenosis [13] or graft versus host disease [14]. Other treatments including exosomes and gene therapies are also being explored.

The proposed effects of biologics are thought to be through the mitigation of the inflammatory processes that are triggered in the impaired tissue. [15] Cytokines that are released by mesenchymal stem cells, PRPs, and exosomes are believed to modulate the inflammatory processes and to prevent inflammation-induced tissue destruction. [16-18]. While progress in this field has been made, many questions remain to be answered, such as the effect of variability of the biological products, regulatory requirements, safety issues, and last but not least high cost. The number of clinical trials published in this area is increasing, yet is still insufficient to determine safety and effectiveness. We are yet to test and verify the benefit and risk ratio of biologics for everyday clinical practice. Also, there is a need to treat a wide spectrum of conditions with diverse pathogenesis and to find the best fits for each of them. Furthermore, patients' interest in stem cells and other human tissue-derived treatments seem to be increasing. For this reason, regulatory agencies are on the front line of taking precautions to protect patients' safety. In this section, we would like to invite leaders of regenerative medicine research in different medical specialties to discuss the current evidence in translational science to recognize recent advances across the fields. In many cases, the knowledge base is limited till this day and our goal is to determine pitfalls that arise while trying to implement such treatments into everyday practice.

Keywords: Regenerative Medicine, osteoarthritis, gene therapies, degenerative disc disease, inflammatory processes.

Tentative titles of the articles and list of contributors:

A. Dr. Jorge Mallea, Mayo Clinic, Florida - Regenerative medicine in COPD.

B. Dr. Gerard Malanga, New Jersey Regenerative Institute - Stem cell therapy and other biologics for treatment of osteoarthritis.

C. Dr. David S. Levi, Norfolk, VA - Musculoskeletal regenerative medicine.

D. Atta Behfar M.D., Ph.D., Mayo Clinic, Rochester – Cardiology and regenerative medicine.

E. Lerman Lilach M.D., Ph.D., Mayo Clinic, Rochester – Regenerative medicine in renal artery Stenosis.

F. Dr. Eva Kubrova, Mayo Clinic, Rochester – Spinal cord injury and regenerative medicine.

G. Dr. Dr. Dmitri Souza, Western Reserve Hospital, – Regenerative medicine in wounds.

H. Dr. Danese S., Istituto Clinico Humanitas, Italy, sdanese@hotmail.com – Inflammatory bowel disease and regenerative medicine.

I. Dr. Olle Ringden, Karolinska Institute – Graft-versus-host disease and regenerative medicine.

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- ✧ Peer Review Due: 07/15/2020
- ✧ Revision Due: 08/30/2020
- ✧ Announcement of acceptance by the Guest Editors: 09/30/2020
- ✧ Final manuscripts due: 11/01/2020

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